

Remarks/Arguments:

Amendments

Claims 37 and 66 have been amended. Support for these amendments is found in original claims 41 and 70 and on page 11, lines 2-18, and Figures 2A and 2B. Claims 41 and 70 have been canceled. Support for new claims 88-95, is found on page 9, line 25, and on page 5, lines 9-13, and page 7, line 24, to page 8, line 8. It is submitted that no new matter is introduced by these amendments and new claims.

The pending claims are 37, 40, 47, 59, 66, 69, 76, and 83-95.

First Rejection under 35 USC 102(b)

Claims 66, 69, 70, 76, 85, and 87 were rejected as anticipated by Gause, U.S. Patent 3,895,158 ("Gause") as evidenced by Paper on Web and as evidenced by Yuhas, U.S. Patent 5,350,621 ("Yuhas"). Claim 70 has been canceled.

As amended, claim 66, on which claims 69 and 87 depend, recites that the core board comprises a fiber sheet that comprises three layers. The second layer, which is between the first layer and the third layer, has a density lower than the density of the first layer and of the third layer. A similar limitation is found in claim 76, on which claim 85 depends.

Gause discloses a laminate that has a resin impregnated core of paper between epoxy resin impregnated woven glass fabric sheets. Gause, Abstract. The Office position is that the resin impregnated core of paper have a lower density that the outer impregnated woven glass fabric sheets. Office action, page 3, line 20, to page 4, line 3.

The Office relies on the density of paper and the density of glass, as shown by Paper on Web and by Yuhas, to show that the densities of the layers are different. Gause discloses that the paper "may be a saturating grade of kraft paper made from water-laid fibrillated cellulose wood and/or cotton linter fibers." Gause, column 3, lines 20-23. And that "The paper core of the substrate of this invention is made from sheets of water-laid cellulosic fibers which have been treated or fibrillated to provide a high degree of bonding between the fibers in the sheet and, therefore provide a high degree of bonding between fibers in the

sheet and, therefore, provide sufficient strength so the sheet can be continuously treated without auxiliary support." *Id.*, column 5, lines 43-49.

The Office relies on Yuhas, table 1, columns 3 and 4, which the Office asserts discloses the density of glass fabrics commonly used in printed wiring boards. Office action of 08/02/07, page 4, lines 5-7. Table 1, columns 3 and 4 show the Glass and Type for typical glass fabric styles. The last two columns show the thickness and weight of the fabric.

According to the Office, "The densities range between 651 kg/m³ for style 106 and 2825 kg/m³ for style 7628." This is equivalent to 0.651 g/cm³ and 2.825 g/cm³. Paper on Web shows that unbleached kraft paper has a density of 0.58 g/cm³ to 0.69 g/cm³, and that bleached kraft paper has a density of 0.83 g/cm³. The density of "a saturating grade of kraft paper" is not expressly disclosed. However, as is apparent from these density values, the density range of glass fabrics commonly used in printed wiring boards overlaps the density range of kraft paper. Based on the disclosure of Gause relied upon by the Office, the relative relationship of the densities of the layers cannot be determined.

Anticipation requires that each and every limitation of the claim be disclosed, either expressly or under principles of inherency, in a single prior art reference. *In re Robertson*, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999). Absence from the reference of any claimed limitation negates anticipation. *Rowe v. Dror*, 42 USPQ2d 1550, 1553 (Fed. Cir. 1997). However, anticipation can not be established by "probabilities and possibilities." *Cont'l Can Co. USA, Inc v. Monsanto Co.*, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991) (citing cases). Therefore, the rejection of claims 66, 69, 76, 85, and 87 as anticipated by Gause as evidenced by Paper on Web and as evidenced by Yuhas should be withdrawn.

Second Rejection under 35 USC 102(b)

Claims 66, 69, 70, 76, 85, and 87 were rejected as anticipated by Yuhas. Claim 70 has been canceled.

The Office relies on the disclosure at column 6, lines 43-55, for disclosure of multilayer laminates that can commonly have up to three layers of different types of fabric. Office action, page 5, lines 8-12. Yuhas discloses that:

A multilayer board is currently designed by a customer specifying the number of conductive layers and the overall thickness of the board. It is usual practice not to mix more than three types of fabrics or resin contents within a single composite board. One to three layers of bonding sheet are used to bond the laminates together, depending on the thickness of the final board. These are made of the typical glass fabrics previously described. The resin content of the bonding sheets are usually higher than the laminates from these cloths. One of the reasons for this is that the excess resin is needed to fill in between the circuitry on the multilayered board to keep the entire board uniformly thick.

Yuhas, column 6, lines 45-51.

As amended, claim 66, on which claims 69 and 87 depend, recites that the core board comprises a fiber sheet that comprises three layers. The second layer, which is between the first layer and the third layer, has a density lower than the density of the first layer and of the third layer. A similar limitation is found in claim 76, on which claim 85 depends. The passage relied on by the Office does not disclose the relative relationship of the densities of the various layers, only that it is usual practice not to mix more than three types of fabrics. Therefore, this limitation is missing from the disclosure of Yuhas.

Anticipation requires that each and every limitation of the claim be disclosed, either expressly or under principles of inherency, in a single prior art reference. Anticipation can not be established by "probabilities and possibilities." Therefore, the rejection of claims 66, 69, 76, 85, and 87 as anticipated by Yuhas should be withdrawn.

First Rejection under 35 USC 103(a)

Claims 37, 40, 41, 47, 83, 84, and 86 were rejected as unpatentable over Kawakita, U.S. Patent 5,960,538 ("Kawakita") in view of Gause as evidenced by Paper on Web and as evidenced by Yuhas. Claim 41 has been canceled. The Office position is that it would be obvious to use the laminate of Gause in the process of Kawakita. *Id.*, page 8, lines 1-5.

However, as discussed above, it cannot be determined if Gause discloses a structure that comprises three layers in which the second layer, which is between the first layer and

the third layer, has a density lower than the density of the first layer and of the third layer. The Office admits that Kawakita is silent with respect to the density of the aramid-epoxy sheet(s) used in the preregs. Office action of August 2, 2007, page 7, lines 1-2. Therefore, this deficiency in Gause is not overcome by Kawakita.

The Office has not made the *prima facie* case. Combination of the references in the manner indicated by the Office does not produce the invention recited in the claims at issue. Therefore, the rejection of claims 37, 40, 47, 83, 84, and 86 as unpatentable over Kawakita in view of Gause, as evidenced by Paper on Web and as evidenced by Yuhas, should be withdrawn.

Second Rejection under 35 USC 103(a)

Claim 59 was rejected as unpatentable over Kawakita in view of Gause as evidenced by Paper on Web and as evidenced by Yuhas, as applied to claims 37, 40, 41, 47, 69, and 83-86, and further in view of Nakatani, U.S. Patent 6,096,411 ("Nakatani").

As discussed above, the combination of Kawakita and Gause does not produce the invention recited in claim 37, on which claim 59 depends, because it cannot be determined if Gause discloses a structure that comprises three layers in which the second layer, which is between the first layer and the third layer, has a density lower than the density of the first layer and of the third layer. This deficiency is not overcome by Nakatani, which was cited for the disclosure of spherical and non-spherical copper particles. Office action of August 2, 2007, page 8, last paragraph, to page 9, lines 1-2.

The Office has not made the *prima facie* case. Combination of the references in the manner indicated by the Office does not produce the invention recited in claim 59. Therefore, the rejection of claim 59 as unpatentable over Kawakita in view of Gause, as evidenced by Paper on Web and as evidenced by Yuhas, and further in view of Nakatani, should be withdrawn.

Third Rejection under 35 USC 103(a)

Claims 37, 40, 41, and 47, 83, 84, and 86 were rejected as unpatentable over Yuhas as applied to claims 66, 69, 70, 76, 85, and 87 above, and further in view of Kawakita. Claim 41 has been canceled.

As discussed above, Yuhas does not disclose the relative relationship of the densities of the various layers. Therefore, Yuhas does not disclose a structure that comprises three layers in which the second layer, which is between the first layer and the third layer, has a density lower than the density of the first layer and of the third layer. The Office admits that Kawakita is silent with respect to the density of the aramid-epoxy sheet(s) used in the prepregs. Office action of August 2, 2007, page 7, lines 1-2. Therefore, this limitation is missing from the combination.

The Office has not made the *prima facie* case. Combination of the references in the manner indicated by the Office does not produce the invention recited in the claims at issue. Therefore, the rejection of claims 37, 40, 47, 83, 84, and 86 as unpatentable over Yuhas in view of Kawakita should be withdrawn.

New claims 89, 91, 93, and 95

Claims 89, 91, 93, and 95 each recite that the fiber sheet is an aramid fiber non-woven fabric. That is, all three layers comprise an aramid fiber non-woven fabric. See, specification, page 11, lines 7-14. The density may be controlled by, for example, calendering of the aromatic fiber non-woven fabric. See, specification, page 8, lines 3-8. As discussed in the specification, resin is not well impregnated in the center section of the aramid fiber non-woven fabric. Much more resin component is attached around the surface layers, forming smooth surface layers. *Id.*, page 10, lines 7-11. This forms a structure in which the inner layer has a lower density than either of the outer layers.

Use of three layers of aramid fiber non-woven fabric in a clad board or in a core board for a clad board, in which the inner layer has a lower density than either of the outer layers, is neither disclosed or suggested by the art of record. In Gause, the Office position is that the laminate structure comprises a resin impregnated cellulosic fiber paper layer between impregnated woven glass fiber layers, that is, Gause discloses different types of

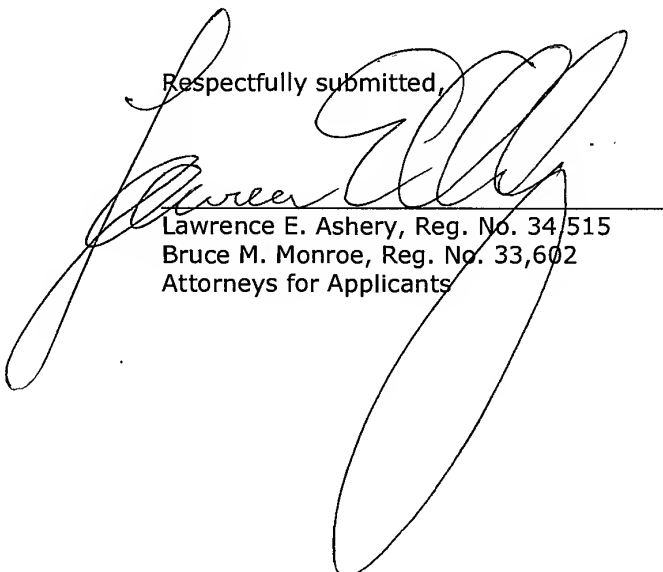
materials, rather than the same type of material. Office action of August 2, 2007, page 3, lines 12-13. In Yuhas, the Office position is that Yuhas teaches multilayer laminates for a printed circuit board which commonly can have up to three layers of different types of fabric. *Id.*, page 5, lines 8-9. The layers are made of glass fabrics. Yuhas, column 6, lines 50-51. The Office admits that Kawakita is silent about the density of the aramid-epoxy layers. Office action of 08/02/07, page 7, lines 1-2. Nakatani was cited for the disclosure of non-spherical conductive particles as a component of conductive paste. *Id.*, page 8, last five lines.

None of the references, either alone or in combination, discloses or suggests that the fiber sheet is an aramid fiber non-woven fabric, in which the inner layer has a lower density than either of the outer layers. Therefore, for this additional reason, new claims 89, 91, 93, and 95 are allowable over the art of record.

Conclusion

It is respectfully submitted that the claims are in condition for immediate allowance and a notice to this effect is earnestly solicited. The Examiner is invited to phone applicants' attorney if it is believed that a telephonic or personal interview would expedite prosecution of the application.

Respectfully submitted,


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